THE REV. THOMAS WILTSHIRE, M.A., D.Sc.

THE Rev. Thomas Wiltshire, whose death, as already announced, took place on October 26, was for some years professor of geology and mineralogy at King's College, London. To geologists he was, perhaps, best known as the honorary secretary of the Palæontographical Society, a post which he held for thirty-six years, in the course of which time he laboured with unceasing energy in the editing of the annual quarto volumes.

He was educated at Trinity College, Cambridge, and, after taking his degree in 1850, he was ordained deacon by the Bishop of Rochester, and in 1853 priest by the Bishop of London. He resided for many years at the rectory, Bread Street, London, E.C., and took duty in various city churches. While at college his attention became arrested in geological subjects, but his literary contributions were few. Among them were essays on the Red Chalk of Hunstanton and on the history of coal. His work was mainly that of a helper of others. He was one of the earliest members of the Geologists' Association, and served as president from 1859 to 1862. Tothe Geological Society of London he rendered good service on the council, and for many years acted as treasurer. He had also been secretary of the Ray Society.

NOTES.

SCIENCE is represented in the long list of birthday honours by three names. Mr. W. H. Power, F.R.S., principal medical officer to the Local Government Board, has been made a Companion of the Order of the Bath; Sir J. J. Trevor Lawrence has been appointed a Knight Commander of the Royal Victorian Order; and Mr. H. J. Chaney, superintendent of the Standards Department, Board of Trade, has been made a Companion of the Imperial Service Order.

THE following is a list of those who have been recommended by the president and council of the Royal Society for election into the council for the year 1903 at the anniversary meeting on December 1. The names of new members are printed in italics:—President, Sir William Huggins, K.C.B., O.M.; treasurer, Mr. A. B. Kempe; secretaries, Sir Michael Foster, K.C.B., and Dr. Joseph Larmor; foreign secretary, Dr. T. E. Thorpe, C.B.; other members of the council, Mr. W. Bateson, Dr. W. T. Blanford, *Prof. H. L. Callendar*, *Mr. F. Darwin*, *Prof. H. B. Dixon*, Prof. G. Carey Foster, Right Hon. Sir John E. Gorst, *Prof. J. W. Judd, C.B.*, *Right Hon. The Lord Lister, O.M.*, *Prof. G. D. Liveing*, *Prof. A. E. H. Love*, Prof. H. A. Miers, *Prof. E. A. Schäfer*, *Capt. T. H. Tizard, R.N., C.B.*, Prof. H. H. Turner, *Sir J. Wolfe Barry, K.C.B.*

ALL who are familiar with the services rendered to science and humanity by the late Prof. Virchow will be glad to know that a movement has been started with the object of erecting a statue to him at Berlin. It is felt by many admirers of Virchow that the memorial should be more than an exclusively German one, for his labours have benefited the world at large, and in this country in particular he has numerous disciples who would regard it a privilege to give evidence of their esteem for him. The proposed formation of a British Committee to assist the Berlin Committee of the Virchow Memorial will therefore meet with substantial support. Lord Lister has undertaken the chairmanship of the Committee and Sir Felix Semon is the honorary secretary *pro tem.* A meeting will shortly be held to elect officers of the Committee and decide upon a form of appeal for contributions. When the invitation to subscribe to the memorial has been issued, there should be a ready response to it, so that Great Britain shall be worthily represented at the monument of a great benefactor of the human race.

THE Earl of Crawford, F.R.S., who is about to take a winter tour round the world in his famous steam yacht *Valhalla*, has invited Mr. M. J. Nicoll, a member of the British Ornithologists' Union, to accompany him as naturalist. After passing through the Straits of Magellan, the *Valhalla* will visit the principal island-groups of the South Pacific, where its naturalist will have ample opportunities for collecting and observing birds and other animals. The return will be made by the Indian Ocean and Suez Canal.

A MOVEMENT is in progress at the Cape to establish in South Africa a society on the lines of the British Association, to be called the "South African Association for the Advancement of Science." Sir David Gill, K.C.B., F.R.S., H.M. Astronomer at the Cape of Good Hope, is to be the first president of the new association, and Mr. W. L. Sclater, director of the South African Museum, has been asked to preside over the zoological section. The first meeting of the association will probably be held at Cape Town at Easter next year.

THE seventh International Congress of Agriculture will be held at Rome next spring.

A REUTER message from Christiania announces, on the authority of Prof. F. Nansen, that an expedition under the leadership of Captain Amundsen will leave in 1903 for Greenland and King William's Land to locate the magnetic pole. The expedition will afterwards continue its way west and will return home *via* Bering Strait. Captain Amundsen will make systematic magnetic observations in the regions traversed, and will also carry on geographical exploration.

WE learn from the *Times* that M. Trouillot, the French Minister of Commerce, and M. Bérard, Under-Secretary for Posts and Telegraphs, are about to pay visits to all the inventors of systems of wireless telegraphy with a view to the ultimate adoption of one of them.

A REUTER telegram from Rome reports that the Captain of the Italian cruiser *Carlo Alberto* has informed the Italian Ministry of Marine that the vessel was in daily communication by wireless telegraphy with Poldhu, in Cornwall, throughout the voyage from England to Canada, and even when the vessel had entered Port Sydney Harbour. The telegram further states that this achievement confirms the possibility of holding simultaneous communications with Europe and America during the navigation of the Atlantic at least up to a distance of 3000 miles.

ACCORDING to the *Electrician*, some of the wireless telegraph messages transmitted from Poldhu to the *Carlo Alberto* on her recent cruise were recorded on installations not belonging to the Marconi Company or put up on their system. In the last issue but one a letter from the Marconi Company recalls, and repeats, the challenge which Mr. Marconi recently made to Sir W. H. Preece or Sir O. Lodge to show that they could pick up his messages, and questions the ability of the *Electrician* to prove that their messages were genuinely intercepted. In reply, the *Electrician* published last week the tape records with an article by Mr. Nevil Maskelyne describing the circumstances under which they were obtained at the wireless telegraph station erected by the Eastern Telegraph Co. at their cable terminus at Porthcwmow (Cornwall). We call attention to the discussion because it is of special interest in view of the proposed Berlin conference, and of the necessity which we have had occasion to point out on one or two recent occasions for consolidation of the competing systems of wireless telegraphy.

THE annual course of Christmas lectures, specially adapted to young people, at the Royal Institution, will be delivered by Prof. H. S. Hele-Shaw, F.R.S., whose subject is "Locomotion:—on the Earth; through the Water; in the Air." The first lecture will be given on Saturday, December 27, and the dates of remaining are December 30, 1902, and January 1, 3, 6 and 8, 1903.

AT the annual meeting of the London Mathematical Society to be held this evening, Mr. Robert Tucker is retiring from the office of honorary secretary. Mr. Tucker was elected secretary in 1867, very shortly after the foundation of the society, and has held the office continuously until now. During this long period he has grudged neither time nor labour in the interests of the society; it is in large measure owing to his zeal and devotion extended over so many years that the society has advanced from a comparatively local beginning to be the representative society of mathematical science in Great Britain. A circular has just been issued, signed by four past presidents of the society, expressing their belief that many members of the society will concur with them in wishing to offer to Mr. Tucker some permanent mark of their appreciation of his services, and requesting that subscriptions for that object may be sent to Dr. J. Larmor, St. John's College, Cambridge, as soon as possible.

WRITING under date November 6, the Paris correspondent of the *Times* states that M. Lacroix, the chief of the French scientific expedition to Martinique, has sent a fresh report to the Colonial Office on the situation in that island. It appears that the zone devastated by the recent eruption is less extensive than was at first thought to be the case. The aspect of the volcano has much changed. A cone has been formed in the crater exceeding in height the former summit. So long as it exists the matter projected will fall in all directions instead of being localised as before on the southern and south-western slopes.

PROF. F. A. FOREL sends us from Morges, Switzerland, a cutting from the *Gazette de Lausanne* of October 31 containing a letter in which he describes the sunset effects at Morges on the evenings of October 28 and 29. Half an hour after the disappearance of the sun, following the gradual extinction of the sunset colours, a peculiar secondary brightening of the western sky was observed and lasted for a second half hour. To begin with, the illumination was of a yellowish-green colour, becoming orange later, and sometimes shading into red near the horizon. Now and then a large, purple-lilac coloured circle with a faint halo and ill-defined contours appeared in the west, having for its centre the sun below the horizon. After observing these effects and noting their remarkable similarity to the sunset displays of 1883 following the eruption of Krakatoa, Prof. Forel expresses the conviction that the phenomena noticed by him in October are due to the impalpable dust particles in the higher regions of the atmosphere which are to be traced to the recent volcanic disturbances in the West Indies.

PARTICULARS of the amounts contributed by the various Powers interested in the international scheme of the North Sea fisheries scientific investigation have been given by the Board of Trade. The amount to be expended in this matter by Great Britain during the next three years is 42,000*l.*, inclusive of 1250*l.* towards the maintenance of a central organisation at Copenhagen. The contributions of other countries (exclusive of the latter item) are as follows:—Denmark—initial expenditure, 9600*l.*; annual expenditure, 5500*l.* Germany—initial expenditure, 16,500*l.* (for steamer), 875*l.* (for equipment); annual expenditure, 6250*l.* Holland—initial expenditure, 666*l.* (instruments, &c.); annual expenditure, 2587*l.* Norway—initial expenditure, 9500*l.* (steamer); annual expenditure, 7370*l.* Sweden—initial expenditure, 1055*l.*; annual expenditure, 1066*l.* Russia—initial expenditure, 16,000*l.* (steamer without equipment); annual expenditure, 12,800*l.* Finland—initial expenditure, 6,000*l.*; annual expenditure, 2,228*l.*

THE utilisation of the internal heat of the earth has often been suggested as an engineering problem of the future. The Rev. E. Rattenbury Hodges directs our attention to an issue of the *Boston News Bureau* in which a scheme is seriously proposed by the official geologist for Pennsylvania of the U.S. Geological Survey and also by Prof. Hallock, of Columbia University, New York, for drawing on the earth's internal heat by means of deep borings. The idea is to admit cold water into a deep boring and utilise the hot water and high-pressure steam produced. Mr. Hodges points out that he made similar suggestions in the *Popular Science News* for January, 1894, in an article on "Our Heat Resources of the Future." He remarked, however, at the time, "The great objection to this drawing on the earth's ancient store of thermal energy would be that her cooling and consequent shrinking would be accelerated; in other words, earthquakes would necessarily become more frequent, and possibly more violent and destructive in their effects."

THE Atlantic forecasts issued at Washington are based on American, Atlantic and European telegraphic reports, and were begun, the chief of the U.S. Weather Bureau states in his last report, at the beginning of 1901. They were, on June 1 of the same year, made a part of the regular general night forecasts published by the Bureau. In a number of instances, when storms of marked strength were passing eastward off the American coast, advices were issued as to the character of the weather which would probably be experienced by steamers leaving European ports westward bound, and by an arrangement with Lloyd's these forecasts have been cabled over here. In addition to the daily forecasts of wind and weather and special storm warnings, predictions of fog have been issued when conditions favourable for fog developments have been indicated in the steamer tracks west of the fiftieth meridian. Reports from Transatlantic steamships have again and again verified these forecasts and special warnings.

THE Meteorological Council has issued a valuable supplement to the temperature tables for the British Islands which were published in the early part of this year. Those tables gave the monthly means of the daily maximum and minimum readings for 117 places; the present volume contains the same stations, grouped as before under districts. The table for each month is divided into two parts, showing (1) the values for thirty years and for each five years (for the observations which extend over the whole time), together with the correction which must be applied to reduce the five years' period to the thirty years' period; (2) the five-yearly mean values for those stations for which the observations extend over less than thirty years, but for which an appropriate correction may be obtained from the values in the first part to enable the mean for thirty years to be computed with a fair approximation to accuracy. The work will be found very useful to actual or intending observers who may wish to compare their results with those of longer series at the same or neighbouring localities.

AS already stated, the eruption of the St. Vincent Soufrière in the night of October 15-16 was followed by another considerable fall of volcanic ash on the island of Barbados, 100 miles to windward. The particles were found to consist chiefly of minute fragments of felspar, with a little volcanic glass, some ferro-magnesian minerals and a very little magnetite, thus differing considerably from the May samples, which consisted largely of ferro-magnesian minerals, with a considerable amount of magnetite. On this account, the dust of last month is likely to prove of greater fertilising value than that of May last. In connection with the latest dust-storm, the officials of the Department of Agriculture endeavoured to determine the effect produced on insect pests and other pests in the field. Two-winged flies, "cow-bees," "wild-bees" and other Hymenoptera suffered severely, but other groups escaped practically unharmed, and there is no doubt that the dust has had little, if any, effect on the insect pests. The dust, in fact, destroyed not the pests, but the useful two-winged flies, &c., which prey on the caterpillars and other pests, so that in this way the volcanic ash has tended to disturb the balance of nature. Its effect is declared to be possibly a harmful one except in the case of the present corn crop, as the dust, lodging in the heart of the young plants, prevents the worms eating into the young leaves.

THE third part of the general report and statistics for 1901 relating to the output and value of the minerals raised in the United Kingdom, the amount and value of the metals produced, and the exports and imports of minerals, edited by Prof. C. Le Neve Foster, F.R.S., has been issued as a Bluebook. The first year of the new century has an unfavourable record so far as the mineral industry is concerned. Quantities have been smaller and prices lower. The value of the coal raised during 1901 represented 88·8 per cent. of the total mineral output for the year, but was six million tons less than the previous year, this being the first interruption in the steady rise since the great strike of 1893. Although the output of coal was less than in 1900, more persons were employed in and about the mines. The output of iron ore has continued to fall since 1899, and the diminution of 1¾ million tons in 1901 represents 12½ per cent. of the quantity raised in the previous year. The comparative unimportance of the metallic ores, other than iron, is easily understood when it is stated that their value only amounts to 800,000*l*., which is just half the value of the sandstone and far less than that of the limestone, the slate or the igneous rocks. The oil-shale mines of Scotland yield a product of greater money importance than the tin mines of Cornwall.

WE have received a report on observations of the tidal currents and undercurrents in the Strait of Dover, published by the Hydrographic Department of the Admiralty. The report consists of two parts. The first part contains observations made by Mr. M. F. J. Wilson, engineer-in-charge of the extension works at the Admiralty pier at Dover, with the object of ascertaining whether a report by divers, that the tidal stream changed its direction at the bottom a very long time before the surface, was correct; the result shows that the report was unfounded. The second part contains observations taken by Captain A. M. Field in H.M.S. *Research* in the Dover channel, in order to test the accuracy of conclusions suggested by the observations made by Captain W. V. Moore in 1896, to the effect that on the English side of the Strait the water below a certain depth was still, while the surface current was strong. The earlier observations are shown to have been erroneous, as the tidal streams run to the bottom of the Strait.

Terrestrial Magnetism and Atmospheric Electricity for September contains a biographical sketch of General Sir Edward Sabine, accompanied by a photographic reproduction of the portrait belonging to the Royal Society.

THE Italian Meteorological Office has forwarded us Nos. 4-6 of its *Bolletino mensuale*, or monthly weather review, containing a note on Count Almerico da Schio's attempts at aërial navigation. The form preferred by Count da Schio is a fish-shaped balloon with flexible keel, the Buchat motor yielded 12 horse-power, and the work of construction has been carried on in a private workshop.

A PAPER by Dr. Loria (Genoa), on the origin and development of geometry prior to 1850, has been translated in the *Monist* by Dr. G. B. Halstead. So far as it is possible to sum up briefly the author's conclusions, it would appear that: (1) While it is impossible to determine the first origin of geometrical research, it is certain that the Assyrians and Babylonians studied many important geometrical problems. (2) The geometry of the Egyptians was of far greater importance, and had a particular tendency towards practical applications. (3) Thales and the Ionic period represent the twilight preceding the dawn of Greek geometry. (4) The "golden period" of Greek geometry came within the Alexandrine epoch, its most conspicuous representatives being Euclid, Archimedes and Apollonius. (5) In the list of Greek geometers, Heron of Alexandria and Claudius Ptolemy play a prominent part, and the "silver period" of Greek geometry was notable for the appearance of Eutocius and Proclus, and especially Pappus. (6) The ascendency of the Romans and the subsequent middle ages represent a period of decadence for geometry. (7) The renaissance of mathematics commenced with the appearance of Leonardo Fibonacci (1200 *circa*), and before the end of the sixteenth century we note the names of Tartaglia, Cardan and Ferrari. (8) The primacy of mathematics in France was attained by the appearance of Viète, Mydorge, Pascal and Desargues; Henry Savile of Oxford and Kepler also belong to this period. (9) A new era was introduced by the analytical methods of Fermat and Descartes. (10) In the next section, Prof. Loria traces the influence of infinitesimal methods on the study of geometry, and (11) considers in particular the development of the study of curves and surfaces in three dimensions.

M. G. LIPPMANN, writing in the *Journal de Physique* for October, describes ingenious methods for verifying whether a ruler or sliding bar is rectilinear, and for fixing a collimator in the focal plane of a lens or telescope objective. For the first purpose he attaches one telescope with cross wires to a "chariot" which runs along the ruler, and observes the image of the wires in a second telescope which is fixed. If the two systems of cross wires remain coincident as the chariot runs along the ruler, M. Lippmann concludes that the ruler is rectilinear, and the only exception that could be made to this inference would be if the surface of the ruler formed a series of waves of length equal to the wheel-base of the chariot. To fix the collimating wires in the focal plane of a lens, M. Lippmann now fixes the auxiliary telescope to the chariot in such a way that it can be displaced parallel to its axis, and he uses it to view the wires in the telescope to be tested. If these remain unchanged in position when the auxiliary telescope is shifted, the collimation is correct; if not, the shift of the image determines the amount by which the wires must be adjusted in order to bring them into the focal plane of the lens. The chariot runs on a sliding piece which has been previously tested by the first method.

MR. BASIL THOMPSON, in his "Notes upon the Antiquities of Tonga" (*Journ.* Anth. Inst., xxxii. p. 81), describes the famous trilithon, or *Haamonga.* He inclines to one traditional account which relates that it was erected by Tui-ta-tui in the latter half of the fourteenth century. It was built for him to sit upon during the Kava ceremonies out of reach of his people, as he so dreaded assassination.

SEVERAL years ago, Mr. Henry Balfour published an important memoir on the musical bow, and in the current *Journal* of the Anthropological Institute (vol. xxxii. p. 156) he describes a superficially similar instrument, the *goura*, which Frobenius and Ankermann have confused with the musical bow proper. The *goura* is a bow-like instrument; one end of its string is fastened to a flattened quill, the other end of which is fastened to the bow, and the string is thrown into vibration through the medium of the quill, which is caused to oscillate by being blown upon. Those musical bows which have no resonator are held to the mouth when playing in order to increase the sound, but with the *goura* the breath causes the vibration, whereas the vibration in the musical bow is caused by tapping or plucking the string.

THE November issue of the *Irish Naturalist* is entirely devoted to the Belfast meeting of the British Association, special attention being directed to papers connected with Ireland.

"PLANKTON" forms the subject of two papers in the *Biologisches Centralblatt*; the September issue contains an account of river-plankton by Mr. A. S. Skorikow, while in the October number Mr. W. Ostwald brings to a close his survey of the theory of plankton in general.

A RECENT issue (vol. iv. part iii.) of *Annotationes Zoologicae Japonensis* contains an account, by Messrs. Ijima and Ikeda, of a rare squid collected at a great depth in the Sagami Sea. The specimen, which is so delicate and translucent that it recalls a jelly-fish, evidently belongs to the genus Amphitretus, founded on a single somewhat damaged example dredged during the cruise of H.M.S. *Challenger*. It is apparently also referable to the type and only species of that genus, hitherto definitely known solely by the original specimen, although a squid taken some time ago in the Agulhas Stream may pertain to the same form. Amphitretus, as its name indicates, differs from all other cephalopods in having the mantle fused in the middle line with the siphon, so that there are two openings of the gills into the gill-cavity on each side.

MESSRS. LAMB AND HANNA have made some interesting experiments upon the neutralising power of anti-venomous serum towards cobra venom and upon the deterioration of this serum through keeping. They find that the maximum amount of venom injected by a cobra into a bite is 45 milligrams, and, assuming that man is as susceptible as the most susceptible animal tested, viz. the rat, estimate that for a man weighing 60 kilograms who received this injection, about 37 c.c. of the fresh serum would be required to save life. They also find that anti-venomous serum undergoes a progressive and fairly rapid deterioration when stored in hot climates, and that this deterioration is greater and more rapid the higher the mean temperature to which it is subjected (*Scientific Memoirs*, Government of India, new series, No. 1, Calcutta, 1902).

ACCORDING to the October number of the *Agricultural Journal* of the Cape of Good Hope, the Government entomologist, Mr. C. P. Lounsbury, has made an important discovery in regard to the propagation of the South African sheep and goat disease known as "heartwater." The so-called bont-tick has hitherto been found to be the only medium of spreading the disease. "A single specimen of this species, if fed on a heartwater-sick animal as a larva or 'seed' tick, has been found capable of transmitting the malady with fatal effect. An animal pastured on veld heavily infested by the tick may drop thousands of pathogenic larvæ during its period of illness and may thus indirectly serve for the almost total extermination of a flock in a few months. The terrible mortality amongst healthy flocks, brought to the coast where the tick is abundant, is thus easily explained. Pathogenic larvæ have been found to retain their dangerous character until they are adult. They may take their second or nymphal feeding on an ox or a non-susceptible goat, and then in the third or final stage get on to a susceptible sheep or goat and give it deadly fever. On the other hand, the disease appears to be non-transmissible through the egg-stage, and the species is normally non-pathogenic in all stages. A farm may be badly infested with bont-tick, yet be entirely free from heartwater." Since the other two common species are innocuous, it is hoped that by keeping down the bont-tick the disease may gradually be stamped out.

A MONOGRAPH of the North American Umbelliferæ, representing the joint work of Prof. J. M. Coulter and Dr. J. N. Rose, has been published in the seventh volume of contributions from the U.S. National Herbarium. The same authors treated this order also for North America in 1888.

THE second quarterly *Bulletin* published by the Botanical Department of Trinidad contains brief articles on the tonka bean, newly-imported mango trees and cane seedlings. Analyses of several Trinidad seedlings yield results which are very promising. An extra number, issued by the same authorities, deals with the cultivation and curing of vanilla in Tahiti. The species grown in that island is mainly *Vanilla pompona*, which yields a less valuable fruit than *Vanilla planifolia*. The former variety has this advantage, that the beans do not split so readily and are, therefore, more easily cured; also it bears flowers twice a year. Pollination is artificially performed, and an efficient worker is said to be able to pollinate two thousand flowers in an eight hours' working day. Curing is a very critical process, as the beans sweat on exposure to the sun, and they must then be covered with blankets and dried at an even temperature.

THE report of the Dominica Botanic Station during the year ending March 31, 1902, contains much valuable information on the work of the establishment, supplied by Mr. J. Jones, the curator; on the experiment plots at the Agricultural School, by Mr. Tannock; and on the cacao experiment plots, by Mr. Whitfield Smith, the travelling superintendent of the Agricultural Department. The monthly rainfall returns from twenty-five stations in the island are also given. Of the various experiments with economic plants, it is interesting to observe that the attempts to introduce early English potatoes are far from being successful at present. Of six varieties planted, three failed completely, two did fairly well and the sixth did excellently. A shipment of 480 pounds of these last was sent to Liverpool, but was not favourably received on the market, experts considering the tubers not bright enough. Still, it is hoped that with further experiments the island may yet compete with the Canary Islands in the production of early potatoes and other vegetables for the English market.

THE Imperial Department of Agriculture for the West Indies continues its series of useful pamphlets on subjects connected with the commercial development of these islands. Mr. A. Howard writes on the treatment of fungoid pests, dealing with them under the head of root, stem, leaf and fruit diseases. The information supplied is for the most part general, but reference is made to the immunity from the so-called "foot rot" or "mal-di-gomma" of sweet orange plants which have been grafted on sour-orange or grape-fruit stocks, and the advantage of treating sugar-cane cuttings with Bordeaux mixture and coating the ends with tar. A second pamphlet gives a number of recipes for cooking West Indian yams, and is issued with the intention of educating the English and American people to appreciate this vegetable.

WE have received copies of two papers read by Mr. H. W. G. Halbaum before the Institution of Mining Engineers, dealing with the difficult problem of mine ventilation and its reduction to simple graphical calculations. One of Mr. Halbaum's objects has been to furnish mining engineers with a form of diagram which shall fulfil the same purpose in the study of mine ventilation that has been so admirably served by Watt's indicator in the case of a steam engine. The second paper deals with an extension of the equivalent orifice theory, in which the writer calculates the relation between the orifice of the ventilating fan and that of the mine in order that the fan may develop its maximum efficiency. It is found that the efficiency is greatest when the orifice of the mine is between onequarter and one-half that of the fan, according to the kind of fan used. If the ratio of the orifices is one-third, the efficiency in all these fans is not more than 2 to 3 per cent. below the maximum, but it falls rapidly when the ratio is outside the limits ½ and ¼. Hitherto there has been a "good old theory" among colliery workers to have large airways and plenty of them, but this theory Mr. Halbaum compares to remedying the defects of a pump by enlarging its suction pipe. The investigation is largely based on the theories of Mr. Murgue, of St. Etienne, from whom, however, Mr. Halbaum differs in certain particulars. We hope the author will be successful in convincing mine owners that mathematical calculations are of more value than "good old theories," but the slow progress which mathematicians are able to effect in breaking down conservatism in other directions does not make his outlook hopeful.

WE have received the first number of *West India*, a bi-monthly illustrated magazine of thirty pages, published by Messrs. Lightbourn's Sons, price ten cents. Its contents are of a very general character, being "devoted to questions and persons and things generally," in prose and verse. The principal article in the issue before us is one by Mr. Francis Watts, on "Glimpses of the Leeward Islands." The Picture Stone, at Harte's Bay, St. Kitts, is dealt with in verse by Dr. Branch.

UNDER the title of *The Illustrated Scientific News*, a new monthly journal devoted to popular science has made its appearance, and we offer it best wishes for a long and successful career. With the second number, an excellent full-page portrait of Lord Kelvin is presented as a supplement. The journal is concerned with inventions and other aspects of engineering work as well as with purely scientific advances. There are, for instance, articles on the 4·7 gun and the Diesel oil engine, as well as on such scientific studies as sounding the atmosphere with kites, Becquerel rays and Foucault's pendulum. Prof. H. H. Turner lightens the pages with a few anecdotes, and asks for other stories of scientific men and manners. This varied contents should find an interested public.

THE thirty-fourth volume of the *Transactions* and *Proceedings* of the New Zealand Institute, which deals with the year 1901, runs to 627 pages and is illustrated by 42 plates. When it is remembered that the Institute includes eight incorporated societies, the proceedings of each of which are here reported, and that the *Transactions* are concerned with zoology, botany, geology, chemistry, physics and miscellaneous subjects, the impossibility of describing the contents of the volume in a short note will be at once understood. In his presidential address to the Auckland Institute, Mr. J. Stewart considered, amongst others, the subject of technical education. He insisted that a youth cannot be taught a trade at a technical school in a manner to enable him to take his place among those who have served a regular apprenticeship to that trade; but that the use of his hands in mechanical handicraft is one of the easiest things for a young man to acquire. The great aim of technical education, he said, is to prepare the intellect to receive and master the scientific basis of all construction and of all manufactures. A paper, also read before the Auckland Institute, by Mr. Elsdon Best, describes very fully the diversions of the "Whare Tapere," a house where the young people of a village gathered at night in order to amuse themselves in various ways, and gives an account of the games, amusements and trials of skill practised by the Maori in former times. A second contribution by Mr. Best of the same date to the same society contains notes upon witchcraft, magic rites and various superstitions as practised or believed by the old-time Maori. Captain F. W. Hutton, F.R.S., is credited with numerous papers, treating of the beetles of the Auckland Isles and other zoological subjects. Other papers are by Profs. Dendy, Benham, A. P. W. Thomas, J. Park and T. H. Easterfield, and when the fifty-four articles brought together in the volume by the director of the Institute, Sir James Hector, K.C.M.G., F.R.S., are considered, the conclusion is reached that science is being worthily advanced by workers at the antipodes.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. T. Turner; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. E. C. Holland; three Indian Porphyrios (*Porphyrio calvus*) from Java, presented by Mr. A. D. Grange; a Woodcock (*Scolopax rusticula*) European, presented by Mr. W. C. Reid; two Common Chameleons (*Chamoeleon vulgaris*) from North Africa, presented by Mr. E. V. Wash; a Smith's Dwarf Lemur (*Microcebus smithi*) from Madagascar, a Barnard's Parrakeet (*Platycercus barnardi*) from South Australia, deposited; a Stone Curlew (*Œdicnemus scolopax*) European, purchased.

OUR ASTRONOMICAL COLUMN.

COMET 1902 *b* AS OBSERVED IN CEYLON.—Mr. H. O. Barnard, of the Ceylon Survey, has communicated some interesting details of Comet 1902 *b*, as observed by him in Ceylon, to the *Ceylon Observer* of October 11.

He records the comet's appearance, using a telescope of "moderate power," as an egg-shaped mass of nebulosity having a very distinct star-like nucleus which is of a reddish colour, and a tail which extended to about 1°·5 from the nucleus on October 7, giving the whole object a "tadpole" appearance; he further adds that it was easily visible to the naked eye, whilst an opera-glass showed a faint trace of the tail, but no nucleus.

Mr. Barnard's computations show that the comet increased its distance from the earth by 45 million (37 million to 82 million) miles during the period October 8 to 28, inclusive, and that its diameter was 200,000 miles, its volume 600 times that of the earth, whilst the length of the tail, on October 7, was about one million miles.

Mr. Barnard expects the comet to be visible again, in Ceylon, just before sunrise in December.

NEW MINOR PLANETS.—Prof. Max Wolf announces, in Nos. 3821 and 3824 of the *Astronomische Nachrichten*, the discovery of five new minor planets. The dates of discovery, positions and magnitudes of these objects are as follows:—

Planet.	Date.	Heidelberg M.T h. m.	α h. m.	δ ° ′	Mag.
1902 J.V.	Oct. 7	10 38·8	2 9·7	+10 55	12·5
,, J.W.	,, 7	13 25·8	2 5·2	3 18	13·0
,, J.X.	,, 7	,, ,,	1 52·9	2 55	13·5
,, J.Y.	,, 24	12 10·3	1 55·2	12 14	13·5
,, J.Z.	,, 24	,, ,,	1 59·2	+12 59	13·0

The daily movements of the respective planets are J.V. −0m.·7, −2′; J.W., −0m.·8, −6′; J.X., −0m.·7, −6′; J.Y., −0m.·8, −6′; J.Z., 0m.·7, −8′.

The planet discovered by Prof. Wolf on October 7 and designated 1902 J.U. proved to be the same as (106) Dione.

NEAR APPROACH OF COMET 1902 *b* TO MERCURY.—A telegram from Prof. Pickering, dated Cambridge, Mass., October 29, announces that Prof. Seagrave finds that Comet 1902 *b* will approach to within two million miles of the planet Mercury on November 29.

Herr M. Ebell, Kiel, has confirmed this telegram from the parabolic elements published by Herr Elis Strömgren in No. 3821 of the *Astronomische Nachrichten*, and which were computed from observations made at Lick (September 1), Nicolaiew (September 20·4) and Strasburg (October 8·4). From the ephemeris accompanying these elements it is seen that the declination of the comet will be too southerly for any further observations to be made in England until about the middle of February, and that its brightness at that time (February 11) will be only 2·1 times its brightness at the time of its discovery, whilst by the end of February this ratio will be reduced to 0·6 (*Astronomische Nachrichten*, No. 3821).